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### INFORMATION CITED BY APPLICANT(S) THAT MAY BE MATERIAL TO THE PROSECUTION OF THE SUBJECT APPLICATION

Applicant: HASSAN, AZIZ et al. Attorney Docket No: BSN7  
Serial No. 10/682,263 Group Art Unit: 1755  
Filed: 9 October 2003 Examiner Name: PAUL D.  
MARCANTONI  
Title: AN ADDITIVE TO RENDER GYPSUM BOARD MOISTURE RESISTANT

### U.S. PATENT DOCUMENTS

Exmr Initials	Cite No.	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
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### FOREIGN PATENT DOCUMENTS

Exmr Initials	Cite No.	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant or Cited Document
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### OTHER INFORMATION

A International Preliminary Examination Report, PCT/US 03/32391

Examiner Signature \_\_\_\_\_ Date Considered \_\_\_\_\_

Examiner: Initial if reference considered, whether or not citation is in conformance with PEP §609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

## PCT

To:

Thomas L. Adams  
P.O. Box 340  
120 Eagle Rock Avenue  
East Hanover, NJ 07936  
ETATS-UNIS D'AMERIQUE

### NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing  
(day/month/year)

08.02.2005

Applicant's or agent's file reference  
BSN7PCT

#### IMPORTANT NOTIFICATION

International application No.  
PCT/US 03/32391

International filing date (day/month/year)  
09.10.2003

Priority date (day/month/year)  
10.10.2002

Applicant  
HRD CORP

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

#### 4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international  
preliminary examining authority:

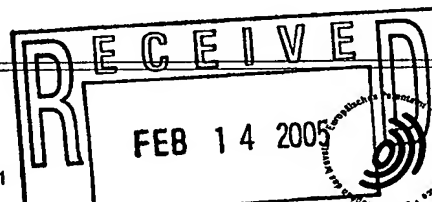


European Patent Office  
D-80298 Munich  
Tel. +49 89 2399 - 0 Tx: 523656 epmu d

Authorized Officer

Ipinazar, P

Tel. +49 89 2399-8131



# PATENT COOPERATION TREATY



## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

Applicant's or agent's file reference BSN7PCT	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/US 03/32391	International filing date ( <i>day/month/year</i> ) 09.10.2003	Priority date ( <i>day/month/year</i> ) 10.10.2002
International Patent Classification (IPC) or both national classification and IPC C04B28/14		
Applicant HRD CORP		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.  
  
☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  
  
 These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:
  - I ☒ Basis of the opinion
  - II ☐ Priority
  - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☐ Certain documents cited
  - VII ☐ Certain defects in the international application
  - VIII ☐ Certain observations on the international application

Date of submission of the demand  10.05.2004	Date of completion of this report  08.02.2005
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Nemes, C  Telephone No. +49 89 2399-7223  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/US 03/2391

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-31 as originally filed

**Claims, Numbers**

1-27 filed with telefax on 18.01.2005

**Drawings, Figures**

1, 2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/US 03/2391**

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-27
	No: Claims	-
Inventive step (IS)	Yes: Claims	1-27
	No: Claims	-
Industrial applicability (IA)	Yes: Claims	1-27
	No: Claims	-

2. Citations and explanations

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US 03/32391

**V. Reasoned statement**

Reference is made to the following documents:

- D1: US 4350736 A (Reily) 21 September 1982
- D2: US 3563786 A (Sydney et al.) 16 February 1971
- D3: WO 98/09925 A (Mobil Oil Co., Ltd.) 12 March 1998
- D4: US 5968237 A (Sinnige) 19 October 1999
- D5: US 3935021 A (Greve et al.) 27 January 1976
- D6: US 5120355 A (Imai) 9 June 1992

**Novelty**

The subject-matter of independent claims 1,8,19,21,24 is considered to be novel, since the compositions, the methods, and the gypsum wallboard claimed therein are not described in the available prior art.

Therefore, independent claims 1,8,19,21,24 fulfil the requirements of Article 33(2) PCT.

**Inventive step**

Documents D1-D6 disclose wax-containing compositions to render gypsum products including gypsum boards water resistant. Of these documents, D3 is considered to be the most relevant. This document describes (cf. page 2, line 1 through page 3, line 10) the use of a petroleum-derived hydrocarbon wax (preferably a paraffin wax) to make gypsum boards water resistant.

The subject-matter of present claims is distinguished from this closest prior art through the following feature:

- according to the present invention, a hydrogenated vegetable wax is mixed into the gypsum composition to make the gypsum board water resistant.

The objective technical problem to be solved by the present invention may therefore be regarded as to provide a further method of rendering a gypsum board water resistant by mixing a wax into the gypsum composition.

Since it was not obvious for the person skilled in the art that the use of a

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/US 03/32391

hydrogenated vegetable wax of the present application instead of a petroleum-derived hydrocarbon wax of D3 is suitable to render gypsum boards water resistant when said wax is added to the gypsum composition, an inventive step can be acknowledged to the subject-matter of independent claims 1,8,19,21,24 and, as a consequence, present claims 1-27 fulfil the requirements of Article 33(3) PCT.

**Industrial applicability**

Claims 1-27 fulfil the requirements of Article 33(4) PCT.

**CLAIMS.**

We claim:

1. A composition to render a gypsum product water resistant, the composition comprising a hydrogenated vegetable wax, wherein the wax is characterized by having an iodine value ranging from 0 to about 30, a melting point ranging from 120 degrees F to about 185 degrees F (Metjler Drop Point), and wherein the wax is selected from the group consisting of soybean, corn, cottonseed, rape, canola, sunflower, palm, palm kernel, coconut, cranbe, linseed and peanut, the composition being added to the gypsum in a quantity sufficient to render the gypsum product water resistant.
2. The composition as described in claim 1, wherein the wax consists essentially of greater than approximately 90% triglycerides (by weight), and wherein the triglycerides comprise a fatty acid, the fatty acid having between approximately 8 to 22 carbon atoms.
3. The composition as described in claim 2, wherein the triglycerides comprise from approximately 50 % by weight to approximately 98 % by weight stearic acid.
4. The composition as described in claim 2, wherein the wax has an iodine value ranging from approximately 1 to approximately 10.
5. The composition as described in claim 4, wherein the wax has an iodine value ranging from approximately 2 to approximately 5.
6. The composition as described in claim 4, wherein the melting point ranges between approximately 145 degrees F to approximately 165 degrees F.
7. The composition as described in claim 6, wherein the wax is soy wax, and the soy wax is added as either a wax solid, or as an aqueous emulsion.

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8. A method to render a gypsum product water resistant, the method comprising the steps of:

forming an admixture comprising gypsum and water;

adding a hydrogenated vegetable wax to the gypsum admixture, the wax selected from the group consisting of soybean, corn, cottonseed, rape, canola, sunflower, palm, palm kernel, coconut, cranbe, linseed and peanut; the wax characterized by having an iodine value ranging from 0 to about 30, and a melting point ranging from approximately 120 degrees F to approximately 185 degrees F (Mettiler Drop Point),

depositing the admixture between a pair of paper liners,

forming sheets of a gypsum product;

heating to a temperature between approximately 200 degrees F to approximately 300 degrees F; and

allowing the deposited admixture to dry.

9. The method as described in claim 8, wherein the wax is added to the gypsum admixture in the form of a wax solid.

10. The method as described in claim 9, wherein the gypsum product comprises from approximately 1 % wax to approximately 15 % wax.

11. The method as described in claim 10, wherein the gypsum product comprises from approximately 2 % wax to approximately 10 % wax.

12. The method as described in claim 11, wherein the gypsum product comprises approximately 3 % wax to approximately 6.5 % wax.

13. The method as described in claim 12, wherein the wax is soy wax.

14. The method as described in claim 8, 9, or 13, wherein the wax is added to the gypsum admixture in an emulsion.

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15. The method as described in claim 14, wherein the gypsum product comprises from approximately 1 % wax emulsion to approximately 20 % wax emulsion.

16. The method as described in claim 15, wherein the gypsum product comprises from approximately 2 % wax emulsion to approximately 15 % wax emulsion.

17. The method as described in claim 16, wherein the gypsum product comprises approximately 8 % wax emulsion to approximately 13 % wax emulsion.

18. The method as described in claim 9 or 14, wherein the gypsum admixture is formed and set into a water resistant gypsum wallboard.

19. A water resistant gypsum wallboard having a core comprising the set composition of claim 10 or claim 15.

20. The method as described in claim 8 or 14, further comprising the addition of one or more materials chosen from the group consisting of petroleum-derived waxes, paraffins, Fischer-Tropsch waxes, microcrystalline waxes, mineral-derived waxes, asphalt, polyvinyl alcohol, and hydrophobic agents.

21. A method for preparing a set, water resistant gypsum product comprising the steps of:

providing an aqueous mixture of gypsum;

adding at least about 1 % by weight of a hydrogenated vegetable wax to the mixture, wherein the wax is characterized by having an iodine value ranging from 0 to about 30, a melting point ranging from about 120 degrees F to about 185 degrees F, the wax selected from the group consisting of soybean, corn, cottonseed, rape, canola, sunflower, palm, palm kernel, coconut, crambe, linseed and peanut; and

forming and setting the mixture into the gypsum product, wherein the total amount of the vegetable wax present is sufficient to render the set gypsum product water resistant.

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22. Cancelled.

23. The method as described in claim 21, wherein the wax is soy wax, and wherein the wax is added to the gypsum mixture in an emulsion.

24. A composition to render a gypsum product water resistant, the composition comprising a hydrogenated soybean wax, the wax characterized by having an iodine value between 0 and about 5, a melting point ranging from about 145 degrees F to about 165 degrees F (Mettler Drop Point), the composition being an aqueous emulsion, the composition being added to the gypsum in a quantity sufficient to render the gypsum product water resistant.

25. The composition as described in claim 24, wherein the wax consists essentially of greater than approximately 90% triglycerides (by weight), and wherein the triglycerides comprise a fatty acid, the fatty acid having between approximately 8 to 22 carbon atoms, and wherein the emulsion further includes nonylphenol ethoxylate.

26. The composition as described in claim 25, wherein the triglycerides comprise approximately 50 % by weight to approximately 98 % by weight stearic acid.

27. The composition as described in claim 24, further comprising one or more materials chosen from the group consisting of petroleum-derived waxes, paraffins, Fischer-Tropsch waxes, microcrystalline waxes, mineral-derived waxes, asphalt, polyvinyl alcohol, and hydrophobic agents.

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